

Penn Cambria Curriculum

Course Name	Anatomy & Physiology 1
Length of Course	<i>1 credit (1 period per day for one semester)- Weighted at 1.10 for GPA calculations</i>
Grade Level	12 (11 th graders admitted)
Prerequisites	85% or above in Honors Chemistry 1 OR Honors Biology 1, or 93% or above in Biology 1 OR Chemistry 1
Course Description	Anatomy and Physiology provides a background in the human body's structures and functions. It is designed for those students who plan on a career in the medical or biological fields. Using a variety of techniques, students will study body composition, cytology, histology, integument, and the muscular, skeletal and central nervous systems. The laboratory, specifically a cat dissection, is an essential component to understanding each of these concepts. Due to the volume of material covered, students are expected to invest time outside of class to master concepts. This course is equivalent to an introductory college course in Anatomy and Physiology and may be taken for college credit through a dual enrollment agreement with Mount Aloysius College (BL201- 4 credits).
Units of Study	<ul style="list-style-type: none"> I. Organization of the Body <ul style="list-style-type: none"> A. The Human Organism B. The Chemical Basis of Life C. The Structure and Function of the Cell D. Tissues and Membranes E. The Integumentary System II. Support and Movement <ul style="list-style-type: none"> A. Skeletal System B. Muscular System C. Articulations III. Communication, Integration, and Control <ul style="list-style-type: none"> A. Nervous Tissue B. The Central Nervous System
Materials	<p>Text: Tate, Philip. <u>Seeley's Principles of Anatomy & Physiology</u>. 1st ed. McGraw-Hill Publishers, 2009.</p> <p>Supplemental Materials:</p> <p>Wise, Eric. <u>Seeley's Principle's of Anatomy & Physiology Laboratory Manual</u>. 1st ed. McGraw-Hill Publishers. 2009.</p> <p><u>Anatomy & Physiology Revealed CD-ROM</u>, 2.0 and accompanying workbook. McGraw-Hill Publishers, 2009.</p> <p><u>MediaPhys 3.0 – An Introduction to Human Physiology CD-ROM</u>. McGraw-Hill Publishers, 2005.</p> <p><u>Ph.I.L.S – Physiology Interactive Lab Simulations CD-ROM</u>, 3.0. McGraw-Hill Publishers, 2008.</p> <p>Labs and drawings from various sources</p>

Unit: Organization of the Body

Estimated Time: 6 – 7 weeks

Standard Alignment:

- 3.1.12.B – Apply concepts of models as a method to predict and understand science and technology.
- 3.1.12.C – Assess and apply patterns in science and technology.
- 3.1.12.E – Evaluate change in nature, physical systems, and man-made systems.
- 3.2.12.A – Evaluate the nature of scientific and technological knowledge
- 3.3.12.A – Explain the relationship between structure and function at all levels of organization.
- 3.3.12.B – Analyze the chemical and structural basis of living organisms.
- 3.3.12.C – Explain gene inheritance and expression at the molecular level

Curricular Objectives:

The student will be able to:

- Define anatomy and physiology.
- Identify the levels of organization that make up the body.
- Define and explain homeostatic control mechanisms.
- Use correct anatomical terminology to describe body directions, regions, planes, and sections.
- Identify major body cavities and their subdivisions.
- Analyze the properties that make water such an important inorganic molecule in living organisms.
- Apply the concept of pH to acids, bases, salts, and buffers.
- List the four major groups of organic substances in the body, give examples, and explain the functions of each group.
- Describe the structure and functions of the cell and its components.
- Illustrate the types of cell connections and describe their importance.
- Compare and contrast the various transport processes the cell uses to move materials in and out of the cell.
- Explain the life cycle of the cell and describe, in detail, what occurs during each time period.
- Describe the formation of the three primary germ layers and list the tissues, organs, and organ system that develop from each.
- Name and describe the types of epithelial tissues.
- List the types of connective tissues and their characteristic functions.
- Compare and contrast the three types of muscle tissue.
- Describe the characteristics of nervous tissue.
- Recognize and name examples of various tissues from pictures, drawings, and/or microscope slides.
- Describe the layers of the skin.
- Explain the functions of the skin.
- Detail the characteristics of the appendages of the skin.
- Identify the musculature of the cat.

Assessments/ Measurement of Objectives:

- Labeling drawings of body regions, animal cells, and tissues
- Textbook review exercises
- Online review quizzes
- Vocabulary exercises
- Objective tests with written/open-ended responses
- Quizzes on cat musculature

Suggested Methods of Instruction / Learning Activities:

- PowerPoint lessons
- Vocabulary activities
- Videos
- Online activities
- Osmosis Lab
- Tissue Lab
- Cat dissection Labs

Unit: Support and Movement

Estimated Time: 6 - 7 weeks

Standard Alignment:

- 3.1.12.B – Apply concepts of models as a method to predict and understand science and technology.
- 3.1.12.C – Assess and apply patterns in science and technology.
- 3.1.12.E – Evaluate change in nature, physical systems, and man-made systems.
- 3.2.12.A – Evaluate the nature of scientific and technological knowledge
- 3.3.12.A – Explain the relationship between structure and function at all levels of organization.
- 3.3.12.B – Analyze the chemical and structural basis of living organisms.

Curricular Objectives:

The student will:

- Differentiate terms used for bone markings.
- Describe the gross anatomy, histology, composition, and function of bones.
- Explain the processes of ossification and bone growth.
- Identify bones in the axial and appendicular skeleton from pictures, drawings, and/or bone models.
- Classify joints on the basis of structure and function.
- Identify, illustrate, and demonstrate the types of movements at synovial joints and give examples of specific joints where each movement occurs.
- Explain the various anatomical features of skeletal muscle on both the gross and microscopic levels.
- Draw and label a sarcomere and a neuromuscular junction and use the drawings to explain the process of muscle contraction.
- Explain the various energy sources used for muscle contraction and the different types of muscle contractions.
- Differentiate among skeletal, smooth, and cardiac muscles in the contraction process.
- Describe various diseases and disorders of the skeletal and muscular systems, and articulations.
- Identify the musculature of the cat.

Assessments/ Measurement of Objectives:

- Labeling drawings of human bones, muscles, and joints.
- Identifying structures using models of bones, muscles, and joints.
- Textbook review exercises
- Online review quizzes
- Vocabulary exercises
- Objective tests with written/open-ended responses
- Quizzes on cat musculature

Suggested Methods of Instruction / Learning Activities:

- PowerPoint lessons
- Vocabulary activities
- Videos
- Online activities
- Cat dissection Labs
- Bone and muscle models

Unit: Communication, Integration, and Control

Estimated Time: 4 - 6 weeks

Standard Alignment:

- 3.1.12.B – Apply concepts of models as a method to predict and understand science and technology.
- 3.1.12.C – Assess and apply patterns in science and technology.
- 3.1.12.E – Evaluate change in nature, physical systems, and man-made systems.
- 3.2.12.A – Evaluate the nature of scientific and technological knowledge
- 3.3.12.A – Explain the relationship between structure and function at all levels of organization.
- 3.3.12.B – Analyze the chemical and structural basis of living organisms.

Curricular Objectives:

The student will be able to:

- Describe the organization of the nervous system.
- Explain the roles of the various types of neuroglia.
- Draw and label a typical neuron.
- Explain how neurons are classified.
- Explain, using words and drawings, the process of generating and propagating an action potential.
- Draw, and use the drawing to explain the transfer of an action potential across a synapse and the formation of postsynaptic potentials.
- List, explain, and give examples of various classes of neurotransmitters.
- Describe the types of protection afforded the central nervous system (CNS).
- Describe the structures and functions of the spinal cord and brain.
- Explain the types and roles of reflexes.
- Describe the characteristics of spinal nerves, the arrangement into nerve plexuses, and the major nerves from each plexus.
- List the 12 cranial nerves, detail the general and specific functions of each, and describe common lesions.
- Describe the types and specific examples of somatic sense receptors and the types of stimuli they each respond to.
- Compare the sensory tracts as to the type of information carried, region of decussation, and where the sensory input goes in the brain.
- Discuss the gate-control theory of pain control.
- Distinguish among the motor areas of the cerebral cortex.
- Compare the direct and indirect motor pathways as to the types of motor impulses carried, regions of decussation, and effector responses.
- Describe how the brain functions in speech, mathematical and artistic abilities, and memory.
- Compare the four types of brain waves.
- Discuss central nervous system disorders and the affects of aging.

Assessments/ Measurement of Objectives:

- Labeling drawings of the human brain, spinal cord, and nerve plexuses.
- Textbook review exercises
- Online review quizzes
- Vocabulary exercises
- Objective tests with written/open-ended responses
- Quizzes on cat musculature
- Labs activity reports

Suggested Methods of Instruction / Learning Activities:

- PowerPoint lessons
- Vocabulary activities
- Models of the brain and spinal cord
- Videos
- Online activities
- Cat dissection Labs
- Sheep brain dissection lab
- Reflex labs